

Ecological site DX032X01W178

Wetland (WL)

Big Horn Basin Wet

Last updated: 10/04/2019

Accessed: 07/14/2026

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 032X–Northern Intermountain Desertic Basins

Major land resource area (MLRA): 032X – Northern Intermountain Desertic Basins – This MLRA is comprised of two major Basins, the Big Horn and Wind River. These two basins are distinctly different and are split by LRU's to allow individual ESD descriptions. These warm basins are surrounded by uplifts and rimmed by mountains, creating a unique set of plant responses and communities. Unique characteristics of the geology and geomorphology single these two basins out. Further information regarding MLRAs, refer to: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

LRU notes

Land Resource Unit (LRU): 32X01W (WY): This LRU is the Big Horn Basin within MLRA 32. This LRU is lower in elevation, slightly warmer and receives slightly less overall precipitation than the Wind River Basin (LRU 02). This LRU was originally divided into two LRU's - LRU A which was the core and LRU B which was the rim. With the most current standards, this LRU is divided into two Subsets. This group is ambiguous of the two official subsets and will be referred to as Subset W, capturing those sites that are a factor of water or other processes outside of the general subset divisions (climate). As the LRU shifts outer edges, aspect and relation to the major bodies of water and taller landforms create minor shifts in soil chemistry influencing the variety of ecological sites and plant interactions. The extent of soils currently correlated to this ecological site does not fit within the digitized boundary. Many of the noted soils are provisional and will be reviewed and corrected in mapping update projects. Other map units are correlated as small inclusions within other MLRA's/LRU's based on elevation, landform, and biological references. Moisture Regime: Aquic, typic aridic, or ustic aridic. Temperature Regime: Mesic Dominant Cover: Rangeland, with Saltbush flats the dominant vegetative cover for this MLRA. Representative Value (RV) Effective Precipitation: 5-14 inches (127 – 355 mm) RV Frost-Free Days: 105-150 days

Classification relationships

Relationship to Other Established Classification Systems: National Vegetation Classification System (NVC): 3 Xeromorphic Woodland, Scrub & Herb Vegetation Class 3.B Cool Semi-Desert Scrub & Grassland Subclass 3.B.1 Cool Semi-Desert Scrub & Grassland formation 3.B.1.NE Western North American Cool Semi-Desert Scrub & Grassland Division M169 Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe Macrogroup Ecoregions (EPA): Level I: 10 North American Deserts Level II: 10.1 Cold Deserts Level III: 10.1.18 Wyoming Basin Level IV: 10.1.18.g Big Horn Salt Desert Shrub Basin

Ecological site concept

- Site is controlled by a water table that is above the soil surface for part but not all of the growing season.
- Slope is 6%.
- Soils are: o Textures range from Silt Loam to clay in top 4" (10 cm) of mineral soil surface o Clay content is 40% within the top 4" (10 cm) of mineral soil surface o All subsurface horizons in the particle size control section have a weighted average of 60% clay. (The particle size control section is the segment of the profile from either the start of an argillic horizon for 50 cm's or from 25-100 cm's).
- o Moderately deep to very deep (20-80+ in. (50-200+ cm) that are poorly to very poorly drained.
- o Surface layer of soil contains a high organic matter content.
- o None to Slightly effervescent throughout top 20" (50 cm) of mineral soil surface o Non-saline, sodic, or saline-sodic

Associated sites

R032XY128WY	Lowland (LL) 5-9" Big Horn Basin Precipitation Zone Lowland sites exist with inclusions of wetlands or may be a step above the wetlands, but they co-exist within the drainage networks of the eroded basin floor.
R032XY138WY	Saline Lowland (SL) 5-9" Big Horn Basin Precipitation Zone Saline Lowland sites exist with inclusions of wetlands or may be a step above the wetlands, but they co-exist within the drainage networks of the eroded basin floor, specifically where there is influence from the marine sedimentary parent material.
R032XY142WY	Saline Subirrigated (SS) 5-9" Big Horn Basin Precipitation Zone Saline subirrigated sites generally surround or are part of the complex dynamic of fluvial systems and are directly associated together as a gradual transition from the wetland to lowland sites.

Similar sites

R032XY378WY	Wetland (WL) 10-14" East Precipitation Zone Wetland 10-14" Foothills and Basins East P.Z., 032XY378WY has higher production.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Carex nebrascensis</i> (2) <i>Deschampsia cespitosa</i>

Legacy ID

R032XA178WY

Physiographic features

This site normally occurs on level to nearly level bottomlands near springs, seeps and sloughs.

Table 2. Representative physiographic features

Landforms	(1) Intermontane basin > Drainageway (2) Intermontane basin > Oxbow (3) Intermontane basin > Stream terrace
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Occasional to frequent

Ponding duration	Brief (2 to 7 days) to very brief (4 to 48 hours)
Ponding frequency	Frequent
Elevation	1,130 – 1,830 m
Slope	0 – 10 %
Ponding depth	0 – 30 cm
Water table depth	0 – 50 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation and modeled relative effective annual precipitation ranges from 5 to 14 inches (127 – 355 mm). The normal precipitation pattern shows peaks in May and June and a secondary peak in September. The noted peaks account for approximately 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation.

Average snowfall is about 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. High winds are generally blocked from the basin by high mountains but can occur in conjunction with an occasional thunderstorm.

Growth of native cool-season plants begins approximately on April 1st and continues through to July 1st. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October. For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/>. "Basin", "Clark 3NE", "Cody", "Cody 12SE", "Emblem", "Greybull", "Heart Mtn", "Lovell", "Powell Fld Stn", "Worland FAA AP", and "Worland" are the representative weather stations for LRU A. The following graphs and charts are a collective sample representing the averaged normals and 30-year annual rainfall data for the selected weather stations from 1981 to 2010.

Table 3 Representative climatic features

Frost-free period (characteristic range)	90-120 days
Freeze-free period (characteristic range)	120-140 days
Precipitation total (characteristic range)	180-230 mm
Frost-free period (actual range)	90-120 days
Freeze-free period (actual range)	110-150 days

Precipitation total (actual range)	180-250 mm
Frost-free period (average)	110 days
Freeze-free period (average)	130 days
Precipitation total (average)	200 mm

- (1) BASIN [USC00480540], Basin, WY
- (2) EMBLEM [USC00483031], Burlington, WY
- (3) GREYBULL [USC00484080], Greybull, WY
- (4) LOVELL [USC00485770], Lovell, WY
- (5) WORLAND [USW00024062], Worland, WY
- (6) WORLAND [USC00489770], Worland, WY
- (7) POWELL FLD STN [USC00487388], Powell, WY
- (8) HEART MTN [USC00484411], Powell, WY
- (9) CLARK 3NE [USC00481775], Powell, WY
- (10) CODY [USC00481840], Cody, WY
- (11) CODY 12SE [USC00481850], Meeteetse, WY

Influencing water features

The characteristics of these soils have influence from ground water (water table above 12 inches (30 cm)) and water will be above the soil surface for part but not all of the growing season. These soils are moderately deep to deep and poorly to very poorly drained.

Wetland description

System: Palustrine

Subsystem: None

Class: Emergent Wetland

Sub-class: Persistent

Stream type: C (Rosgen)

Soil features

This site consists of deep to very deep poorly drained soils formed in alluvium with a water table above the surface for part but not all of the growing season. They are on nearly level to slightly depressed areas with poor surface drainage. In some places the surface layers have high organic matter content. The soil characteristics having the most influence on the plant community are depth to a water table at or near the surface for all of the growing season.

Major Soil Series correlated to this site include: Fluvaquents

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale
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Surface texture	(1) Mucky clay (2) Clay loam (3) Loam (4) Silt loam (5) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Slow to moderate
Soil depth	50 – 150 cm
Available water capacity (0-101.6cm)	5.59 – 16.76 cm
Calcium carbonate equivalent (0-101.6cm)	10 – 20 %
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 20
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4

Ecological dynamics

Potential vegetation on this site is dominated by plants that can tolerate soils which have a water table near the surface for most of the growing season and are slightly saline. The expected potential composition for this site is about 80% grasses, 10% forbs and 10% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

As this site deteriorates, species such as willows, rushes, and bulrush increase. Grasses such as Nebraska sedge and tufted hairgrass will decrease in frequency and production.

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				1261-1765	
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	1261-1765	–
2				504-1261	
	water sedge	CAAQ	<i>Carex aquatilis</i>	504-1261	–
3				504-1261	
	beaked sedge	CARO6	<i>Carex rostrata</i>	504-1261	–
4				252-757	
	tufted hairgrass	DECE	<i>Deschampsia cespitosa</i>	252-757	–
5				252-757	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0-252	–
	American sloughgrass	BESY	<i>Beckmannia syzigachne</i>	0-252	–
	reedgrass	CALAM	<i>Calamagrostis</i>	0-252	–
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	0-252	–
	flatsedge	CYPER	<i>Cyperus</i>	0-252	–
	fowl mannagrass	GLST	<i>Glyceria striata</i>	0-252	–
	mountain rush	JUARL	<i>Juncus arcticus</i> ssp. <i>littoralis</i>	0-252	–
	rush	JUNCU	<i>Juncus</i>	0-252	–
	reed canarygrass	PHAR3	<i>Phalaris arundinacea</i>	0-252	–
	bluegrass	POA	<i>Poa</i>	0-252	–
	bulrush	SCIRP	<i>Scirpus</i>	0-252	–
	alkali cordgrass	SPGR	<i>Spartina gracilis</i>	0-252	–
Forb					
6				252-504	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0-252	–
	silverweed cinquefoil	ARAN7	<i>Argentina anserina</i>	0-252	–
	smooth horsetail	EQLA	<i>Equisetum laevigatum</i>	0-252	–
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	0-252	–
	rough bugleweed	LYAS	<i>Lycopus asper</i>	0-252	–
	waterhorehound	LYCOP4	<i>Lycopus</i>	0-252	–
	wild mint	MEAR4	<i>Mentha arvensis</i>	0-252	–
	common plantain	PLMA2	<i>Plantago major</i>	0-252	–
	alkali buttercup	RACY	<i>Ranunculus cymbalaria</i>	0-252	–
	sagebrush buttercup	RAGL	<i>Ranunculus glaberrimus</i>	0-252	–
	blue-eyed grass	SISYR	<i>Sisyrinchium</i>	0-252	–
	marsh hedgenettle	STPA	<i>Stachys palustris</i>	0-252	–
	seaside arrowgrass	TRMA20	<i>Triglochin maritima</i>	0-252	–

Shrub/Vine					
7				252-757	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0-252	–
	Woods' rose	ROWO	<i>Rosa woodsii</i>	0-252	–
	narrowleaf willow	SAEX	<i>Salix exigua</i>	0-252	–
	willow	SALIX	<i>Salix</i>	0-252	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 6.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 7.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

Wildlife Interpretations Nebraska sedge/Tufted Hairgrass Plant Community: The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. This plant community may provide brood rearing/foraging areas for upland game birds. Other birds that would frequent this plant community include red-wing blackbirds, sand hill cranes, Wilson snipe, western meadowlarks, and golden eagles. Many small mammals would occur here. Mid-Sedge/Willow Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in willow production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds. Low-Sedge/Baltic Rush Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer and whitetail deer. This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for upland game birds and songbirds, when it occurs proximal to woody cover. Cattail/Low Sedge Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in cattail production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds. Sedge/Cattail Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in cattail production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds. Sedge/Saltcedar and/or Russian Olive Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in tall shrub production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds. Some species utilize the Russian olive berries for food and are attracted to these colonized areas. Dense Saltcedar and/or Russian Olive Stand Plant Community: The proximity to water makes this state important for wildlife such as birds, mule deer, and whitetail deer. This is useful for the same large grazers that would use the Historic Climax Plant Community. The low production of herbaceous understory of this plant community decreases the foraging potential and cover for many wildlife species. The increase in tall shrubs, however, makes this an attractive site for thermal and escape cover for large grazers and upland birds. It can provide foraging and nesting opportunities for songbirds. Some species utilize the Russian olive berries for food and are attracted to these colonized areas. Grazing Interpretations The following table lists suggested

stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor. Plant Community Production Carrying Capacity* (lb. /ac) (AUM/ac) Historic Climax Plant Community 3000-6000 2.5 Mid-Sedge/Willow 2750-5500 1.8 Low-Sedge/Baltic Rush 1200-2500 0.8 Cattail/Low Sedge 2750-4000 1.0 Sedge/Cattail 3000-5000 1.2 Sedge/Saltcedar and/or Russian Olive 3000-5000 1.2 Dense Saltcedar and/or Russian Olive Stand 1750-2500 0.5 * - Continuous, season-long grazing by cattle under average growing conditions. Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Hydrological functions

Climate is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration rate is slow and runoff potential high for the soils of this site due to a high water table and saturated soil conditions. However, high forage production on this site diminishes runoff potential as long as site is managed for maintaining adequate residual vegetation. (Refer to Part 630, NRCS National Engineering Handbook for detailed hydraulic information). Rills and gullies should not typically be present. Water flow patterns may be present if associated with a perennial flowing stream. Litter typically falls in place, and signs of movement are not common unless associated with a perennial flowing stream. Chemical and physical crusts are rare to non-existent.

Recreational uses

This site provides hunting opportunities for upland game species. The wide varieties of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

Information presented here has been derived from NRCS inventory data. Field observations from range trained personnel were also used. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties. Inventory Data References Data Source Number of Records Sample Period State County SCS-RANGE-417 19 1965-1986 WY Park & others

Approval

Scott Woodall, 10/04/2019

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Ray Gullion
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Date	05/02/2008
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills: Rills should not be present

2. Presence of water flow patterns: Barely observable

3. Number and height of erosional pedestals or terracettes: Essentially non-existent

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):
Bare ground is less than 5%

5. Number of gullies and erosion associated with gullies: Active gullies should not be present

6. Extent of wind scoured, blowouts and/or depositional areas: None

7. Amount of litter movement (describe size and distance expected to travel): Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):
Plant cover and litter is at 95% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 5 or greater.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Use Soil Series description for depth and color of A-horizon

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Healthy deep rooted native grasses enhance infiltration and reduce runoff. Infiltration varies from moderate to low and runoff is high since the soil is usually saturated.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): No compaction layer or soil surface crusting should be present.

12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):

Dominant: Tall Grasses and Grasslike

Sub-dominant: Mid stature Grasses/Grasslike = Shrubs/Trees

Other: Forbs

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Very Low

14. Average percent litter cover (%) and depth (in): Average litter cover is 50-55% with depths of 0.75 to 1.5 inches

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): 4500 lbs/ac

16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: Baltic rush, Bulrush, Arrowgrass, Horsetails, Kentucky Bluegrass, Saltcedar, Russian olive, Cattails, Annuals, other Exotics, and other Species found on Noxious Weed List.

17. Perennial plant reproductive capability: All species are capable of reproducing
